Anda Chirila, Ph.D.

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Education

Ph.D. Molecular Pharmacology and Physiology, Brown University 2015
B.Sc. Biochemistry and Cell Biology (*with honors*), Jacobs University Bremen, Germany 2009

Research Experience

Postdoctoral fellow with Dr. David Ginty
Department of Neurobiology, Harvard Medical School 2015-present

- Developed a preparation and analysis framework for *in vivo* large-scale spinal cord electrophysiology in combination with mouse genetic manipulations and computational approaches to reveal key spinal cord circuit motifs and projection neurons that underlie normal and aberrant tactile reactivity.
- Investigated dorsal horn responses to mechanical stimuli in somatosensory neuron specific protocadherin gamma mutants to help establish a role for protocadherin gamma in sensory neuron synapse maturation and dorsal horn circuit assembly.
- Collaborated to establish molecular genetic toolkit for the spinal cord dorsal horn. Helped define the resulting eleven morphologically and functionally distinct interneuron populations, and demonstrated a role for local circuit dynamics in modulating dorsal horn output.
- Mechanistically defined a role for autism spectrum disorder (ASD) associated genes in peripheral somatosensory neurons leading to dorsal horn inhibitory circuit dysfunction and projection neuron hyperexcitability.

Graduate student with Dr. Julie Kauer
Molecular Pharmacology and Physiology, Brown University 2009-2014

- Examined synaptic transmission and plasticity of glycinergic synapses in acute spinal cord slice preparations. Defined a role for the inflammatory cytokine IL-1β in upregulating glycine receptors on dorsal horn neurons to modulate processing of nociceptive signals and pain behaviors.
- Investigated synaptic signaling mechanisms underlying long-term depression in hippocampal circuits associated with learning and memory.

Publications

Meltzer S, Comeau K, **Chirila AM**, Osei-Asante E, DeLisle M, Zhang Q, Kalish BT, Tasnim A, Huey E, Fuller LC, Flaherty EK, Lefebvre JL, Maniatis T, Garrett AM, Weiner JA, Ginty DD. (2023) γ-Protocadherins control synapse formation and peripheral branching of touch sensory neurons. ***Neuron*** 111(11):1776-1776. DOI: 10.1016/j.neuron.2023.03.012.

Rankin G, **Chirila AM**, Emanuel AJ, Zhang Z, Woolf CJ, Drugowitsch J, Ginty DD. (2023) Nerve injury disrupts temporal processing in the spinal cord dorsal horn through alterations in PV+ interneurons. *In revision*. **bioRxiv**, DOI: 10.1101/2023.03.20.533541.

Chirila AM*, Rankin G*, Tseng SY, Emanuel AJ, Chavez-Martinez CL, Zhang D, Harvey CD, Ginty DD. (2022) Mechanoreceptor signal convergence and transformation in the dorsal horn flexibly shape a diversity of outputs to the brain. ***Cell*** *185(24):4541-4559.* *equal contribution. DOI: 10.1016/j.cell.2022.10.012.

Springel MW, Emanuel AJ, **Chirila AM**, Kim SJ, Rhyins J, Iskols M, Harvey CD, Ginty DD. (2023) Corticospinal neurons modulate touch information processing in the spinal cord in a temporally and spatially precise manner. *In preparation*.

Kloc ML, Pradier B, **Chirila AM**, Kauer JA. (2019) NMDA receptor activation induces long-term potentiation of glycine synapses. ***PLoS One*** *9;14(9):e0222066*. DOI: 10.1371/journal.pone.0222066.

Orefice LL, Mosko JR, Morency DT, Wells MF, Tasnim A, Mozeika SM, Ye M, **Chirila AM**, Emanuel AJ, Rankin G, Fame RM, Lehtinen MK, Feng G, Ginty DD. (2019) Targeting peripheral somatosensory neurons to improve tactile-related phenotypes in ASD models. ***Cell*** *178(4):867-886*. DOI: 10.1016/j.cell.2019.07.024.

Abraira VE*, Kuehn ED*, **Chirila AM**, Springel MW, Toliver AA, Zimmerman A, Orefice LL, Boyle KA, Bai L, Song BJ, Bashista KA, O'Neill TG, Zhuo J, Tsan C, Hoynoski J, Rutlin M, KuS L, Niederkofler V, Watanabe M, Dymecki SM, Nelson SB, Heintz N, Hughes DI, Ginty DD. (2017) The cellular and synaptic architecture of the mechanosensory dorsal horn. ***Cell*** *168(1-2):295-310*. *equal contribution. DOI: 10.1016/j.cell.2016.12.010.

Orefice LL, Zimmerman A, **Chirila AM**, Sleboda S, Head J, Ginty DD. (2016) Peripheral mechanosensory neuron dysfunction underlies tactile and behavioral deficits in mouse models of ASD. ***Cell*** *166(2):299-313*. DOI: 10.1016/j.cell.2016.05.033.

Dingle YT, **Chirila AM***, Boutin ME*, Livi L, Labriola NR, Jacubek L, MorgaN JR, Darling EM, Kauer JA, Hoffman-Kim D. (2015) 3D Neural Spheroid Culture: An In Vitro Model for the Central Nervous System. ***Tissue Engineering Part C- Methods*** *21(12):1274-83*. *equal contribution. DOI: 10.1089/ten.TEC.2015.0135.

Chirila AM*, Brown TE*, Bishop RA, Bellono NW, Pucci FG, Kauer JA. (2014) Long-term potentiation of glycinergic synapses triggered by interleukin 1β. ***Proc. Natl. Acad. Sci****. 111(22):8263-8*. *equal contribution. DOI: 10.1073/pnas.1401013111.

Brown TE*, **Chirila AM***, Schrank BR, Kauer JA. (2013) Loss of interneuron LTD and attenuated pyramidal cell LTP in Trpv1 and Trpv3 KO mice. ***Hippocampus*** *(8):662-71*. *equal contribution. DOI: 10.1002/hipo.22125.

Invited Seminars

Rutgers University, Department of Cell Biology and Neuroscience Seminar Series	2023
Tan Yang Center for Autism Research at Harvard University	2023
Max Planck Institute for Brain Research, External Postdoctoral Seminar Concatenations (mEPSCs)	2022
The 35th Barrels International Meeting, Society for Neuroscience	2022
Harvard University Department of Molecular and Cellular Biology Seminar Series	2022
UT Southwestern Medical Center Seminars in Neuroscience, a Postdoc Series	2022
Harvard Medical School Department of Neurobiology Seminar Series	2020
Ellen R. and Melvin J. Gordon Center Annual Conference on the Cure and Treatment of Paralysis	2019
Harvard Medical School Department of Neurobiology Systems Club	2018
University of Wyoming Department of Neuroscience	2017
Brown University Neuroscience Seminar Series	2014
Brown University Neuroscience Seminar Series	2013
Brown University Molecular Pharmacology and Physiology Seminar Series	2012
Brown University Neuroscience Seminar Series	2011

Selected Conference Posters

Chirila AM. Rankin G, Tseng SY, Emanuel AJ, Harvey CD, Ginty DD. (2022) Mechanoreceptor signal convergence and transformation in the dorsal horn flexibly shape a diversity of outputs to the brain. Vertebrate Sensory Systems Keystone Symposia.

Chirila AM. Rankin G, Tseng SY, Emanuel AJ, Harvey CD, Ginty DD. (2020) Neural computations in the mechanosensory spinal cord. Somatosensation: From Detection to Perception Keystone Symposia.
Chirila AM, Rankin G, Tseng SY, Emanuel AJ, Abraira VE, Orefice LL, Ginty DD. (2019) Neural computations in the mechanosensory spinal cord. Mammalian Sensory Systems Keystone Symposia.
Chirila AM, Ginty DD. (2018) Neural circuits for tactile discrimination in the mechanosensory dorsal horn. Optogenetic Approaches to Understanding Neural Circuits and Behavior Gordon Research Conference.
Chirila AM, Ginty DD. (2016) The role of cutaneous sensory neuron collaterals in tactile coding. Optogenetic Approaches to Understanding Neural Circuits and Behavior Gordon Research Conference.
Kloc M, **Chirila AM**, Stevenson RJ, Kauer JA. (2016) Potentiation of glycinergic IPSCs in the dorsal horn by Ca^{2+}, NMDA and cAMP. Soc. Neurosci., online.
Daniel M DuBreuil, **Anda Chirila**, Summer E Allen, Sylvia Denome, Julie A Kauer, Diane Lipscombe (2015). Elucidating the contribution of defined sensory neuron subpopulations to nociception and chronic pain. 2nd European Calcium Channel Conference. Alpach, Austria.
Chirila AM, Brown TE, Stevenson RJ, Bishop RA, Kauer JA. (2014) Long-term potentiation of glycinergic synapses triggered by interleukin1β. Soc. Neurosci.
Chirila AM, Brown TE, Bellono NG, Kauer JA. (2013) Interleukin 1β induces long-term potentiation of glycinergic synapses on dorsal horn GABAergic neurons. Soc. Neurosci., online.
Chirila AM, Brown TE, Kauer JA (2012) Signaling events underlying TRPV1-mediated long-term depression at excitatory synapses on hippocampal interneurons. Soc. Neurosci.
Chirila AM, Brown TE, Schrank B, Kauer JA (2011) Essential role for transient receptor potential vanilloid 3 (TRPV3) in synaptic plasticity in the hippocampus. Soc. Neurosci.
Chirila AM, Brown TE, Kauer JA. (2010) TRPV3 is required for long-term depression at excitatory synapses on hippocampal interneurons. Synaptic Transmission Gordon Research Conference.
Chirila AM, Nobrega D, Glasgow A, Bearer E. (2009) Imaging APP and JIP1/2 in Action: Quantitative Spatiotemporal Dynamics of Transport in Squid Giant Axons. Mol. Biol. Cell 20 (suppl). Abstract 1869/B248.

Research Funding

The Ellen R. and Melvin J. Gordon Center for the Cure and Treatment of Paralysis Post-Doctoral Fellowship in Neurobiology 2018-2022
Title: Spinal cord circuits for tactile sensation and movement
Goldenson Fellowship 2018-2019
Title: A spinal cord circuit controlling sensory-motor gating
The Harvard Mahoney Neuroscience Institute Fund Post-Doctoral Fellowship 2017-2018
Title: Role of Aβ-LTMR Collaterals in Tactile Coding
Helen Fitzgerald Cserr Memorial Fund Predoctoral Fellowship 2010-2011

Awards and Honors

First Prize, Graduate student research poster, Mind Brain Research Day 2014
RI Society for Neuroscience Chapter Graduate Student Travel Award 2013
Travel Grant to Society for Neuroscience Conference, New Orleans LA 2012
Travel Grant to Society for Neuroscience Conference, Washington D.C. 2011

Professional Memberships

Tan Yang Center for Autism Research at Harvard University 2020-Present
American Association for the Advancement of Science 2014-present
Society for Neuroscience 2010-present
American Society for Cell Biology 2008-2010

Reviewing Activities

Reviewer by invitation: *Nature*	2023-present
Co-reviewer with Dr. David Ginty: *Cell, Cell Reports, Science*	2017-present
Reviewer by invitation: *Scientific Reports*	2016-present
Co-reviewer with Dr. Julie Kauer: *Nature Neuroscience*	2013-2014

Outreach and Teaching Experience

Diversity and Inclusion Education Subcommittee, Harvard Medical School	2020-2022
Women in Neuroscience, Harvard Medical School	2015-present
Graduate Student Liaison to the Sheridan Center for Teaching and Learning, Brown University	2012-2014
Lecturer, Brown University	2013
BIOL 0119- Synaptic Plasticity and Transmission	
Taught by Dr. Julie Kauer	
Teaching Assistant, Brown University Summer Pre-college Program	2012
The Motivated Brain	
Taught by Dr. Abigail Polter	
Lecturer, Brown University Continuing Studies Program	2012
Stress, Brain and Behavior	
Taught by Dr. Abigail Polter	
Teaching Assistant, Brown University	2010
BIOL 2260- Physiological Pharmacology	
Taught by Dr. John Marshall	

Mentoring Experience

- Closely mentored undergraduate students and graduate rotation students in experimental design, technical and professional development, data analysis, scientific writing and presentations. Students contributed to peer reviewed publications and are pursuing advanced degrees.

Genelle Rankin, HMS graduate student	2017-2023
Lijun Qi, HMS graduate student	2018-2019
Ada Oancea, Northeastern University co-op student	2023-present
Megan Yee, College of the Holy Cross summer student	2022
Matthew Yee, Boston University undergraduate	2019-2022
Annie Chen, Simmons University undergraduate	2019
Sarah Tsan, Simmons University undergraduate	2017-2019
Kaitlyn Clausel, Northeastern University co-op student	2018
Terri Javaluyas, Northeastern University co-op student	2017
Carmine Chavez-Martinez, HHMI EXROP summer student	2016, 2017
Danielle T. Morency, Simmons University undergraduate	2015-2017
Rachel Bishop, Brown University, research technician	2013-2014